5.4 Factoring Polynomials

GCF

ex 1:

$3x^2 + 6x$

$3x(x + 2)$

Regular $ax^2 + bx + c$

ex 2:

$x^2 - 2x - 8$

1 8
2 4

+c same sign
-c different signs

$(x + 2)(x - 4)$

ex 3:

$6x^2 - 11x - 10$ "Stretch"

$6x^2 - 15x + 4x - 10$

$3x(2x - 5) + 2(2x - 5)$

$(3x + 2)(2x - 5)$

ex 4:

$8x^2 + 14x + 5$

$(2x + 1)(4x + 5)$

Patterns

i. $a^2 - b^2 = (a + b)(a - b)$

ii. $a^2 - 2ab + b^2 = (a - b)^2$

iii. $a^2 + 2ab + b^2 = (a + b)^2$

ex 5:

$4m^2 + 4m + 1$

2m
1

$(2m + 1)^2$

ex 6:

$x^3 - 12x^2 + 36x$

$x(x^2 - 12x + 36)$

$x(x - 6)^2$

ex 7:

$y^2 - 49$

$(y + 7)(y - 7)$

ex 8:

$4x^{10} - 9y^8$

$(2x^5)^2 - (3y^4)^2$

$(2x^5 - 3y^4)(2x^5 + 3y^4)$

ex 9:

$4x^{2n} - 16y^{4n}$

$(x^n)^2 = x^{2n}$

$(2y^{2n})^2 = 4y^{4n}$

$4(x^{2n} - 4y^{4n})$

$4(x^n + 2y^{2n})(x^n - 2y^{2n})$

If a problem is not factorable, then write:

Prime

2 New Patterns

iv. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
Sum of cubes

v. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
Difference of cubes

$1^3 = 1$
$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$
$6^3 = 216$